Further morphological variations in Bornean phasmids: *Carausius cristatus* Brunner, and *Lonchodes haematomus* Westwood.

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Abstract
Some morphological variations in *Carausius cristatus* Brunner, and in *Lonchodes haematomus* Westwood are illustrated and discussed.

Key words
Phasmida, variations, Borneo, *Carausius cristatus, Lonchodes haematomus.*

Carausius cristatus Brunner

Following the excellent article by Bragg (1995) I decided to check my specimens of *Carausius cristatus* Brunner as well as make some notes of variations in my series of *Lonchodes haematomus* Westwood. Bragg's original collection, of 4 female specimens in 1990, obviously bred true to their maternal phenotype. His second collection of two females resulted in some offspring having the head, mesonotum and fifth abdominal crests as figured by him.

I collected four mating pairs of *C. cristatus on* the Silau Silau trail near Mount Kinabalu National Park Head Quarters in Sabah whilst on a collecting trip with C.L. Chan in 1993. Three of my four wild caught females showed different variations from those illustrated by Bragg whilst only one was similar to the female of Bragg's 1990 collection. All the males were exactly alike and appeared to be no different from those illustrated by Bragg.

Females (Figures 1A-1C)

I will not attempt to repeat the very good description of *C. cristatus* laid out by Bragg, except to point out the further variations in my wild caught females.

Specimen A (fig. 1A) was most like Bragg's original specimens. Coarse granulations were however prominent over the mesonotum, metanotum, mesosternum and metasternum, as well as the 3rd, 5th and the 6th abdominal segments. The end of the 7th, 8th and 9th abdominal segments were prominently raised, albeit only slightly above the contour of the top of the following abdominal segments as illustrated.

Specimen B (fig. 1B) had coarser granulations over the mesonotum and the metanotum; almost blunt rose-thorn like in shape. Coarse granulations were again present over the mesosternum and the metasternum and over the 2nd, 3rd, 4th and 5th abdominal segments. A prominent tubercle was present on the lateral sides of the 5th and 6th abdominal segments. There was a raised ridge-like elevation over the caudal end of the 7th abdominal segment. The caudal end of the 8th and the 9th abdominal segments were also very markedly raised as over-hanging protuberances.

Specimen C (fig. 1C) displayed the most prominent tubercles of the three specimens. There were numerous rose-thorn like tubercles over the mesonotum and several over the metanotum. Coarse granulations were present as usual over the mesosternum and metasternum. Prominent tubercles were found over the 2nd, 5th and 6th abdominal segments. The two lateral tubercles over the 5th and 6th abdominal segments in this specimen being large and like the tail-wings of an aeroplane.

Lonchodes haematomus Westwood

Lonchodes haematomus is a species which is very common in parts of Borneo. This species has been found in Sarawak, Brunei and Sabah. I have collected this species from Sabah and

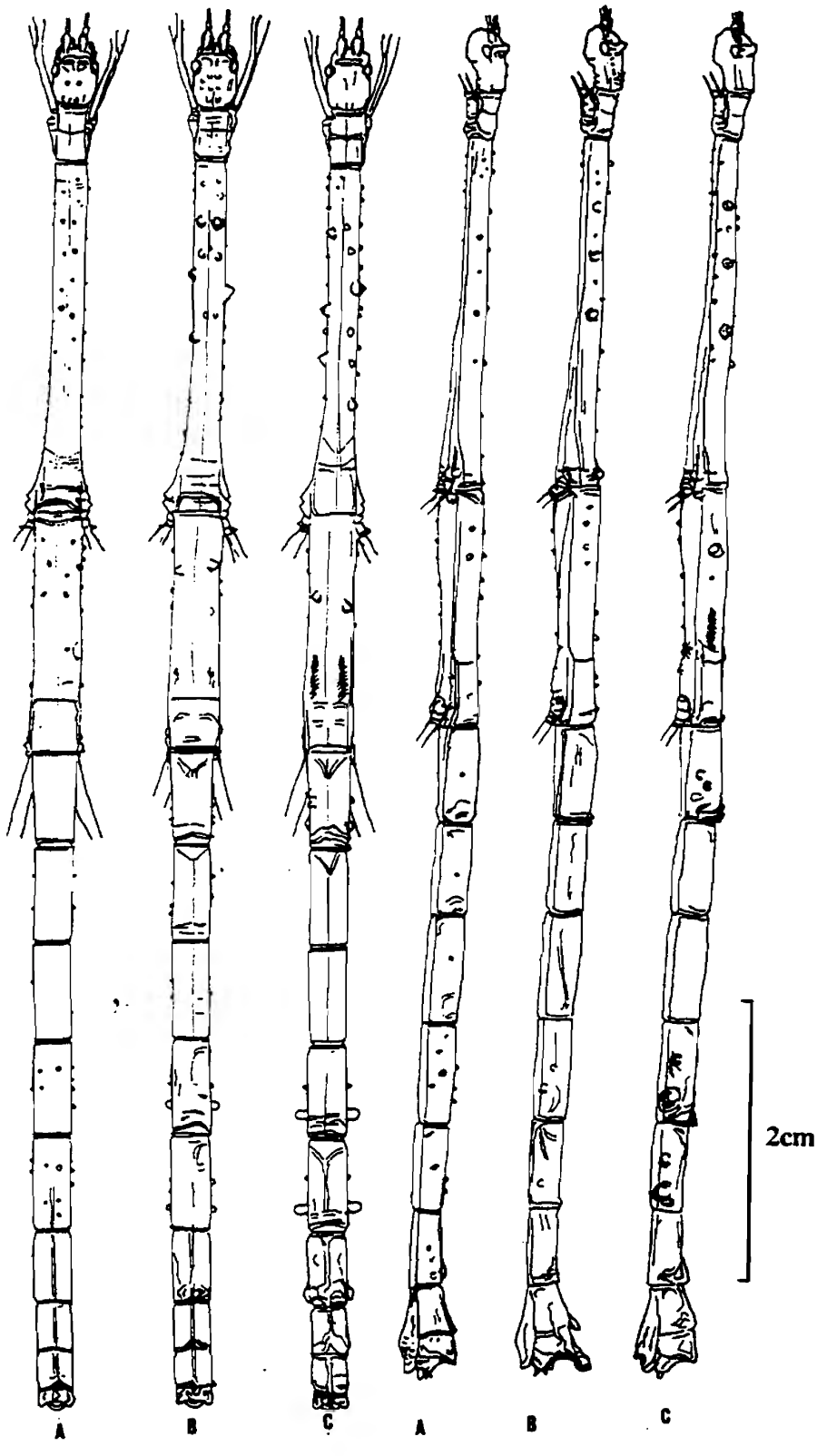

Figure 1. Females of *Carausius cristatus*.

Brunei as well as raised specimens from eggs collected from Sarawakian specimens. This species is extremely easy to breed in captivity and readily takes *Rubus fruticosus* as well as *Rubus moluccanus*. Although I have reared specimens of this species in a large mixed cage in the garden, offspring of mixed ancestry were not studied and the phasmids illustrated represent only those phasmids that were wild caught or hatched from eggs of females that were mated in the wild.

This is a species which, in common with many other *Lonchodes* species, shows great variation in external morphology in the female whilst males of the species do not show any variability in external form. The adult male is illustrated in figure 2. Variations in the adult female are shown in figure 3. Females from Brunei tend to have less humps and swellings on the abdomen and thorax, whereas females from Sabah are the opposite and are often well endowed with prominent protuberances.

L. haematomus	♂	♀		♂	♀
Total length	112-150	144-174	Fore femora	17-23	17-22
Antennae	36-57	34-38	Fore tibiae	17-28	16-21
Head	3-4	5-6	Fore tarsi	5-6	6
Pronotum	3.0-3.5	5.0-5.5	Mid femora	14-18	15-18
Mesonotum	21-28	26-32	Mid tibiae	10-13	12-14
Metanotum	12-17	14.0-17.5	Mid tarsi	5.0-5.5	5.0-5.5
Abdomen *	39-51	62-73	Hind femora	16-22	17-20
			Hind tibiae	16-22	15-20
			Hind tarsi	5-6	6

Table 1. Measurements of the longest and shortest specimens of *Lonchodes haematomus* in the author's collection. * The length of the abdomen includes the median segment.

Illustrations of variation in *Lonchodes haematomus* females (figure 3)

Specimen A (figs. 2A & 3A) was wild caught at Sepilok, Sabah. It lacked the prominent mesonotal swelling, there is also a noticeable black dot on the median segment as well as on the fifth abdominal segment.

Specimen B was also found at Sepilok. This specimen has the mesonotal swelling (but the apex of the abdomen is very similar to specimen A) and it also shows the black dot on the median segment and the fifth abdominal segment.

Specimen C is also from Sepilok. The mesonotal swelling is present but there are also smaller swellings on the second, fifth, sixth and seventh abdominal segments. The last abdominal segment also shows a longer extension than in the specimens illustrated so far in this paper.

Specimen D was raised from eggs laid by an insect caught in Sabah. It was like specimen C in general form although the abdominal apex was similar to A.

Specimen E was caught at Rampayoh Waterfalls in Brunei. This phasmid was similar to specimen A but for the length of the extension of the last abdominal segment.

Specimen F was found at Sepilok. The operculum is keeled and protrudes beyond the end of the last abdominal segment.

Specimen G is from Sepilok. It has raised prominences at the end of the mesonotum, and ends of the eighth and ninth abdominal segments.

Specimen H is descended from Brunean stock and shows the extension of the last abdominal segment.

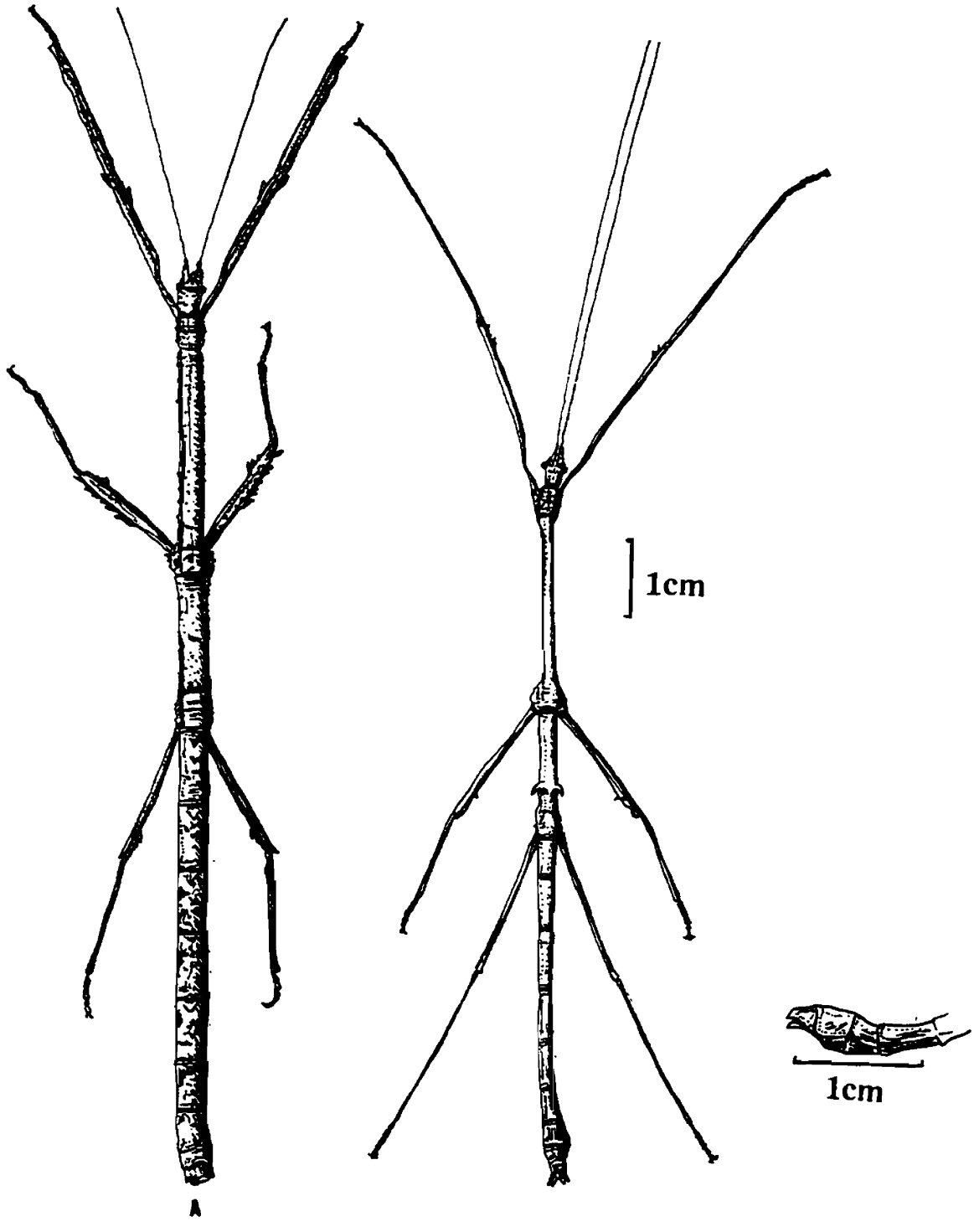

Figure 2. *Lonchodes haematomus*, female, male and apex of male's abdomen.

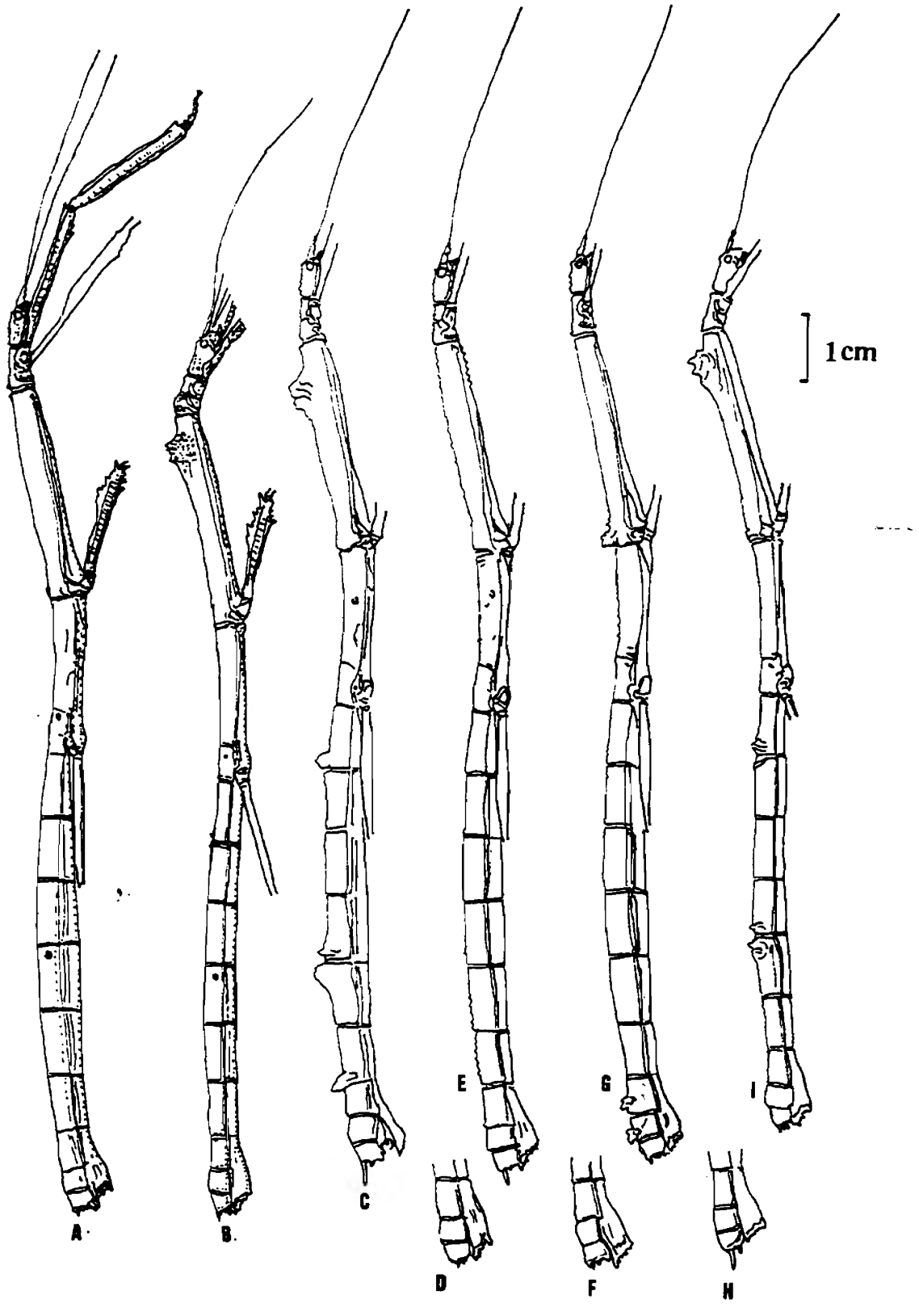

Figure 3. *Lonchodes haematomus*, lateral views of females. For details see text.

Specimen I is similar to specimen C, but with the swellings less fully developed.

It can be seen from the illustrations that *Lonchodes haematomus* is indeed a very variable insect. Numerous collecting trips in the region have led me to be wary of labelling any collected insect as new until a long series of both wild caught and captive bred specimens have been reviewed, otherwise the taxonomy of the phasmids will not ever be cleared of synonyms and confusion.

References

Bragg, P.E. (1995) Variation in three Bornean species of Lonchodinae: *Carausius cristatus* Brunner, *Lonchodes modestus* (Brunner) and *Lonchodes strumosus* (Brunner). *Phasmid Studies*, 4(2): 70-86.